

PROTECTIVE ENCLOSURE FOR HAZARDOUS MATERIAL PRIMARY CONTAINERS

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates generally to shipping containers and, more particularly, to a method and device for safely packaging and shipping hazardous materials, especially biological infectious substances and radioactive samples.

While government regulations specify standards for shipment of explosives, flammables, radioactive materials and other hazardous chemicals, there are presently no regulations regarding shipping of biological specimens such as blood, urine or other body fluids which are commonly analyzed for medical diagnostic purposes. Thus, these materials may be shipped through the mail and by private carriers without restriction. While only occasionally does a shipping container break, the consequences of a breakage of the primary container for the hazardous material can be catastrophic for unknowledgeable and unprotected individuals who are handling it.

The present invention addresses the need for safely transporting hazardous materials by providing a method and device which greatly reduces the chance of damage to the primary container for the hazardous material during shipment and also greatly reduces the risk of exposure to the hazardous material if the container is damaged.

It is therefore a primary object of the present invention to provide a method and device for transporting hazardous materials, especially infectious substances and biological specimens.

As a corollary to the foregoing objective, an important aim of the invention is to provide a method and device of transporting hazardous material which protects the primary container for the material against breakage during shipment.

Another corollary to the object above stated is to provide a method and device which protects those who handle hazardous materials during shipping from exposure to danger if the primary container for the hazardous material does break.

Another object of the invention is to provide a method and device for transporting primary containers of hazardous materials wherein the device is designed to destruct upon opening thereby assuring that it cannot be used more than one time.

It is also an important aim of our invention to provide a method and device which assures the integrity of samples obtained in random and blind testing of workers, athletes and racing animals by assuring that a container for such a sample cannot be the subject of tampering during shipment without giving a visible indication that tampering has occurred.

Another one of the objects of this invention is to provide a method and device of the type described which may include a shock warning device so as to provide an immediate indication if the transporting package has received a dangerously high shock during shipping.

It is also an important one of the objectives of our invention to provide a method and device of the type described wherein a plurality of the devices can be serially numbered to enhance tracking during shipment.

A further but by no means final objective of the invention is to provide a method and device of the type described wherein a shipping container may be constructed to house a single primary container of hazardous material or multiple primary containers of hazardous material as the need may dictate.

Other objectives of our invention will be apparent from the following description and claims when read in light of the accompanying drawing:

FIG. 1 is an exploded perspective view of the shipping device of the present invention;

FIG. 2 is a vertical cross sectional view, with portions shown in elevation, and taken along the line 2—2 of FIG. 1; and

FIG. 3 is a horizontal cross sectional view looking in the direction of arrows 3'3 of FIG. 1.

Referring initially to FIG. 1, the device of the present invention is designated generally by the numeral 10 and includes a generally cylindrical enclosure 12 and a complementary top 14. Enclosure 12 includes an elongated generally cylindrical main body section 16 of a first diameter and an integral top body section 18 of a somewhat larger diameter than first section 16. The point of juncture between body sections 16 and 18 presents a ledge 20 on the inside of the enclosure. Manifestly, sections 16 and 18 present a continuous sidewall of enclosure 12. An integral bottom section 22 is visible in FIG. 2 and is generally planar so as to present a flat bottom surface.

Spaced downwardly a short distance from the uppermost edge of top body section 18 is a circumferentially extending detent 24 the purpose of which will be described hereinafter. Section 18 terminates in an outwardly extending tip 26 which extends around the entire circumference of the top. As noted in FIG. 1, enclosure 12 is provided with two vertically extending lines of weakness 28, each of which is designed in the drawing by closely spaced parallel broken lines. Integrally formed into top body section 18 in the area between lines of weakness 28 is a tab 30 which is positioned beneath lip 26. By virtue of extending outwardly at least as far as tab 30, lip 26 offers protection against accidental opening of the tab during shipment.

The inside of body section 16 is lined with a water impervious liner 32 made of polyethylene or other suitable material. Spaced further inwardly from body section 16 on the inside of water impervious liner 32 is a resilient layer 34 of foam rubber or other cushioning type of material.

Top 14 includes a cylindrical sidewall 36 which is of a diameter to be received by top body section 18 and to this end includes a channel 38 which extends around the circumference of sidewall 36 and receives detent 24 in locking relationship. Top 14 includes a top planar section 40 which in turn supports a rounded dome section 42 characterized by indentations 44 which present gripping surfaces for the fingers of a user. A small cutaway section 46 in the top of the dome section 42 provides an area for locating a shock exposure indicator of a type well known to those skilled in the art but not shown in the drawings in the interest of brevity.

With reference to FIG. 2, the inside of top 14 is lined with a water impervious liner 48 constructed of the same material as liner 32. On the inside of liner 48 is a layer 50 of resilient material which may be the same material as layer 34.

In use, the device 10 is utilized to hold a primary container such as stoppered vial 52 illustrated in FIG. 2.